

REMARKS/ARGUMENTS

In an Office Action dated August 4, 2005 claims 1-3, 10-12, 19-21, and 28-30 were rejected under § 102 based on Yamamoto and claims 4-9, 13-18, 22-27 and 31-36 were rejected under § 103 over Yamamoto and Arakawa. Applicants respectfully traverse the rejections and request consideration of the following arguments.

Specification Amendment

The specification is amended to fill in the missing portions of the list of related cases in paragraph [0003].

Claim Amendments

Various claims have been amended to correct an antecedent basis error.

Brief Review of Described Embodiments

Prior to addressing the rejections, Applicants consider it helpful to provide this brief review of various of the described embodiments.

One embodiment provides a device which is placed into a communications fabric, particularly a storage area network (SAN) to provide data migration for data stored on the SAN. The embodiment provides this migration capability as an element in fabric, not as a device which acts as a gateway or even part of the hosts or servers or as a module included in a storage unit. This allows heterogeneous data migration with full fabric configuration flexibility.

To accomplish this data migration in the fabric the embodiment uses a series of ports and port processors to connect to the fabric, with the port processors connected by an internal crossbar switch. A control unit is provided to coordinate the port processors and handle higher level operations. See Figure 4. In the preferred embodiment each port processor actually includes a number of individual embedded processors, with various queues and hardware support. See Figure 5. The control unit and the embedded processors run various software modules to provide the components of the desired data

migration. As shown in Figures 19, 20A and 20B, the embedded processors handle the actual data read and write operations and trap any writes occurring to a data block being moved, in addition to the normal data virtualization operations.

It is noted that the embodiment has the data migration occurring for virtualized volumes so that read and write operations are directed to the embodiment, thus limiting possibilities for read and write operations occurring around the embodiment.

Therefore the embodiment is positioned in the fabric between the host and the storage unit and presents itself as a virtual storage unit. By changing mapping tables internal to the embodiment, the embodiment can control data migration between old and new physical storage units without requiring remapping of the various hosts and while the units are online.

§ 102 Rejections

Claim 1

Claim 1 was rejected over Yamamoto. Specifically, the Office Action references paragraphs 20 and 23 to allegedly show a switch coupling said port processors and paragraph 21 to allegedly show a control module and apparently to also show the I/O module and control module being configured to interactively support data migration. Applicants traverse these points.

Paragraph 23 of Yamamoto is provided here for reference:

[0023] Continuing with **FIG. 1**, the various adaptors **26**, . . . , **32** of the storage controller **14** connect to drive interface adaptors **46**, one for each physical disk unit **20**, through a system bus **36A**, **36B**, and a connecting facility **40**. The connecting facility is basically an arbiter that functions to arbitrate communicative access between the various interface adaptors **26**, . . . , **32** and the drive interface adaptors **46**. In addition the connecting facility **40** will also arbitrate access for the interface adaptors **26**, . . . , **32** to the cache memory **42**.

Apparently the connecting facility 40 is being equated to the switch of claim 1. However, this is improper. Yamamoto clearly says the connecting facility 40 is “basically an arbiter.” This correlates well when it is noted that the interface adaptors are connected by a system bus 36A and the drive interface adapters are connected by a system bus 36B. Additionally, a cache memory 42 is shown, presumably also with a bus interface. With these various buses, the connecting facility 40 would be an arbiter as specifically stated in Yamamoto. It would not be a switch as required in the claims. This is a first missing element.

Applicants further submit that Yamamoto does not show the claimed control module. The Office Action references paragraph 21, but this paragraph only describes the various interface adapters 26 – 32. As these have apparently already been correlated to be the port processors by referencing paragraph 22, this leaves nothing in paragraph 21 to properly correspond to the required control module.

Further, there is nothing in paragraph 21 to show data migration as required in the claim.

Applicants thus submit that numerous elements of claim 1 are not shown in Yamamoto when the claim and Yamamoto are fully considered.

Claim 2

The Office Action references paragraph 29 of Yamamoto with respect to claim 2. Applicants traverse this rejection. Paragraph 29 describes various interface adapters at very high levels. Applicants do not find anything in the paragraph that properly corresponds to table information related to data migration. Therefore the rejection is improper and should be withdrawn.

Claim 3

The Office Action references paragraphs 29 and 35 – 39 with respect to claim 3. Applicants can find nothing in paragraphs 35 – 39 which are relevant to claim 3 except for a reference to a logical volume address converter function 76, which has been mentioned generally in paragraph 29. None of the lock/unlock items which consume much of paragraphs 35 – 39 are relevant to claim 3. Thus Applicants submit that similar

elements to those in claim 2, namely the table information, and the additional elements of claim 3, namely barrier entries in the table information and delay of write operations, are not shown in Yamamoto.

Claims 10 and 19

While the Office Action specifically points out the host and storage devices in Yamamoto, it fails to provide any item correlating to the “at least one switch for coupling to the at least one host and the at least one storage device” required in both claims. This is in addition to not having support for the switch coupling the port processors as described above with respect to claim 1. Therefore claims 10 and 19 are allowable for these further reasons.

Claims 10-12, 19-21 and 28-30

The arguments above with respect to claims 1 – 3 apply to their corresponding claims in claims 10-12, 19-21 and 28-30, thus rendering those claims allowable.

§ 103 Rejections

Kodama v. Yamamoto

Applicants are slightly confused over the § 103 rejections. Yamamoto was used to form the § 102 rejections (even though it was not cited on the PTO-892 form) but now Kodama is used for the § 103 rejections. This is complicated by the fact that no recitation to any locations in Kodama are cited to allow Applicants to clarify which reference is actually being asserted. Applicants understand that Kodama is a CIP of Yamamoto but the filing dates that Applicants believe they are entitled to rely on in this application predate the filing of Kodama so that only the carryover portions from Yamamoto would be applicable in any event. Thus Applicants will treat the § 103 rejection as being based on Yamamoto rather than Kodama.

Claim 4

Claim 4 requires that the table information includes an entry related to the extents in the data migration, the entry defining an extent operation type. Arakawa, on the other hand, relates to snapshots and virtualization. Arakawa has no mention of data migration,

only virtualization, snapshots and copying. As a result Arakawa cannot teach or suggest entries related to the extents in the data migration as required in claim 4. Therefore, the rejection is improper and should be withdrawn.

Claim 5

Claim 5 requires that the table information further includes a legend entry for each extent operation type defining migration operations for the extent. As noted above, Arakawa includes no mention of data migration, so it cannot teach or suggest this requirement of legend entries for each extent operation type defining migration operations, which operations it never teaches or suggests. The rejection is improper and should be withdrawn.

Claim 6

Claim 6 is submitted as being allowable because since Arakawa does not teach or suggest the elements modified by claim 6, it cannot begin to teach or suggest the requirements of claim 6.

Claim 7

As stated above, Arakawa does not even mention data migration so it cannot begin to teach or suggest the legend entries defined in claim 7, all of which relate to data migration. The snapshot or virtualization entries in Arakawa simply do not teach or suggest the required data migration entries.

Claim 8

Because numerous elements required for claim 8 are not present, taught or suggested by Yamamoto or Arakawa the rejection is improper. With no teaching of a data migration barrier entry, there can be no teaching or suggestion to respond to such an entry by delaying data write operations as required on claim 8. Further, the location referenced in Arakawa in the Office Action, relates to setting a state to "access prohibited," which is different from delaying a write operation and would not teach delaying but rather disallowing completely.

Claim 9

Because numerous elements required for claim 9 are not taught or suggested by Yamamoto or Arakawa, the rejection is improper. With no teachings of data migration or a data migration barrier entry, there can be no teaching or suggestion to place a barrier entry for data being copied.

Claims 13-18, 22-27 and 31-36

The arguments relating to claims 4-9 relate to their counterparts in claims 13-18, 22-27 and 31-36 such that those claims are allowable.

CONCLUSION

Based on the above remarks Applicants respectfully submit that all of the present claims are allowable. Reconsideration is respectfully requested.

Respectfully submitted,

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Date

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